REMARKS

This application has been carefully reviewed in light of the Office Action dated June 16, 2004 (Paper No. 25). Reconsideration and further examination are respectfully requested.

Claims 1 to 4, 6, 7, 12 and 14 (all of the claims pending in the application) were rejected under 35 U.S.C. § 103(a) over the combination of U.S. Patent No. 6,108,008 (Ohta), U.S. Patent No. 6,151,025 (Yen), U.S. Patent No. 6,204,933 (Yoshino), and U.S. Patent No. 6,442,662 (Komatsu). Reconsideration and withdrawal of this rejection are respectfully requested.

Turning to specific claim language, amended independent Claim 1 is directed to an image processing apparatus for converting input color data to color component data, having a plurality of color component units, to be outputted by using a color conversion table. The apparatus comprises a first storage, arranged to store at least one compressed color conversion table, wherein data of the compressed color conversion table are arranged according to a sequential ordering of grid point numbers in each color component unit; an expander, arranged to expand the compressed color conversion table; a sorter, arranged to sort data included in the expanded color conversion table while a combination of output color components of a grid point is kept; and a converter, arranged to convert the input color data to the color component data using the expanded color conversion table.

In this manner, the invention of independent Claim 1 utilizes an efficiently compressed color conversion table which can be expanded and used for converting color image data, thereby reducing the necessary storage capacity required for the conversion process (specification, page 2, line 14, to page 3, line 9). In the present invention, combinations of plural color component data included in the color conversion table are arranged by grid points as shown

in Fig. 2C. A compression processing of the color conversion table is efficiently performed when the data of the color conversion table is sorted to be arranged in an order according to a set of grid point numbers (Fig. 3). According to the present invention, the data of the expanded color conversion table is sorted while a combination of output color components of a grid point is kept. In a particular embodiment, data of the color conversion table is sorted so that the data is arranged in a sequential order according to the set of grid point numbers.

The applied art, namely Ohta, Yen, Yoshino and Komatsu, is not seen to disclose or suggest the foregoing features of independent Claim 1. In particular, the applied art is not seen to disclose or suggest storing at least one compressed color conversion table, wherein data of the compressed color conversion table are arranged according to a sequential ordering of a set of grid point numbers in each color component unit, expanding the compressed color conversion table, sorting data included in the expanded color conversion table while a combination of output color components of a grid point is kept, and converting the input color data to the color component data using the expanded color conversion table.

As discussed in Applicant's previous Amendment, Ohta is seen to be concerned with rendering a preview image as it would appear if it were formed by a predetermined image device, wherein the rendered preview image is created using a stored profile which corresponds to the predetermined image forming device (Ohta, abstract; Figure 2; and column 1, lines 60 to 67.) Although Ohta is seen to disclose the use of three-dimensional look-up tables (LUT) for converting Lab color space to CMYK color space, the three-dimensional look-up tables in Ohta are not seen to be compressed and are not seen to have the data contained therein which is arranged according to a sequential ordering of a set of grid point numbers in each color component unit (Ohta, column 13, lines 20 to 48). Finally, nowhere is Ohta seen to teach sorting

data included in the expanded color conversion table while a combination of output color components of a grid point is kept.

Also as previously discussed by Applicant, Yen is not seen to remedy the foregoing deficiencies of Ohta. Specifically, Yen is seen to utilize a compressed look-up table for use in two-dimensional linear convolutions for image processing (Yen, abstract; and column 4, lines 51 to 67.) The look-up table of Yen is merely seen to contain partial results which are obtained by determining possible patterns for a row of an input pixel window and multiplying the possible patterns by a corresponding row of a convolution kernel matrix (Yen, column 5, lines 17 to 25.) In this manner, the calculation results are pre-stored in the look-up table for application to an actual row of an input pixel window, thereby saving calculation processing time during convolutions for image processing, such as for a smoothing operation.

However, the look-up table of Yen is not seen to be a compressed color conversion table wherein data of the compressed color conversion table are arranged according to a sequential ordering of a set of grid point numbers in each of a plurality of color component units. The look-up table in Yen is merely seen to be a compressed table for use in performing a smoothing operation. The look-up table in Yen is not seen to be concerned with plural color components, much less with data arranged in sequential order according to a set of grid point numbers in each color component unit. Also, nowhere is Yen seen to teach sorting data included in the expanded color conversion table while a combination of output color components of a grid point is kept.

Yoshino is not seen to remedy the foregoing deficiencies of Ohta and Yen. Yoshino is seen to be directed to the use of compressed image data to pass to a printer which expands the compressed image data for printing, for efficient print data transmission and memory use (Yoshino, abstract; and column 2, lines 1 to 15). Yoshino is merely seen to "set" a particular

type of color processing table to carry out color processing for a color printer (Yoshino, Fig. 16; and column 9, lines 45 to 51). However, Yoshino is not seen to disclose or suggest a color conversion table in which color data are arranged according to a sequential ordering of grid point numbers in each of a plurality of color component units. Neither is Yoshino seen to disclose sorting data included in the expanded color conversion table while a combination of output color components of a grid point is kept.

In this regard, it is alleged in the Office Action that Yoshino teaches the "sorting" feature of the claimed invention. Applicant again strongly disagrees with this allegation, and submits that the allegation is based on a misreading of the cited portion of Yoshino which is taken out of context from the teachings of Yoshino. In particular, the cited portion of Yoshino states in full:

> "In a case of the color print, *a sort of a table* for necessary to carry out the color processing is set, in this time in a case where the color laser printer **21A** has a resource therein, a table which is provided an interior portion therein is set, on the other hand in a case where a data of the table is transmitted from the personal computer **20A**, such an above stated table is set." (Yoshino, column 9, lines 45 to 51, italics added).

This portion of Yoshino has been consistently misquoted in the previous Office Actions. Specifically, "a sort of a table" has been inexplicably quoted as "a sorted table".

Applicant submits that the cited portion of Yoshino does not constitute a syntactically correct sentence, thereby requiring interpretation of the sentence's meaning from the context of the sentence. However, there is no support whatsoever in Yoshino for interpretation of the phrase "a sort of a table" as "a sorted table" as alleged in the Office Action. As previously stated by Applicant, the cited language from Yoshino has to do with setting the proper type of table, and has nothing to do with actually performing a sorting operation on a table. Rather, the cited portion of Yoshino discloses the setting of an appropriate type of table. Nowhere does Yoshino mention that a sorting operation is performed on a table, much less sorting data included in an expanded color conversion table while a combination of output color components of a grid point is kept.

Komatsu is not seen to remedy the foregoing deficiencies of Ohta, Yen and Yoshino. Komatsu discloses a method of memory management within a data storage apparatus. Komatsu discloses a conversion table 10a having rows of elements wherein "(e)lement 100i indicates an outside address number, element 10b indicates a flag used for determination of the stored block address, and element 10c indicates a block address storage area." The block address storage area stores block addresses corresponding to the outside address number. Flag 10b serves as a free block address identification component and indicates whether an address stored in the block address storage area is an address to a free area or not (Fig. 3, Column 7, Lines 10 to 20). For example, in FIG. 3, when the outside address number is "6", the flag used for determination of the stored block address has a value of "1" and the block address is "10". This means that external address 6 is mapped to a currently used block area having an address of 10.

Thus, Komatsu discloses a conversion table mapping between memory addresses in a one-dimensional and contiguous memory to memory addresses in a one-dimensional but

non-contiguous memory. As such, the actual data stored in the conversion table is not ordered as alleged in the Office Action. In fact, the actual data stored in the conversion table is not ordered in any meaningful fashion at all. This is because the actual data stored in the conversion table are the usage flags and the internal memory addresses, both of which change in time. In the case of the flags, the flags will become randomly distributed between the values of "0" and "1" during usage of the memory mapped by the conversion table. The state of these values will not be ordered based on the of the external memory addresses but will be disordered based on the demands placed on the memory. In a like fashion, the values of the addresses stored for the storage blocks will become disordered based on allocation and deallocation of the storage blocks.

In contrast, Applicant's input color data for a color conversion table is normalized as color conversion data located in a multi-dimensional space identifiable as a grid point, as shown in Fig. 2B of the present application. The color component data of the color conversion table is defined corresponding to the grid points, as shown in Fig. 2C of the present application. Furthermore, the multi-dimensional grid points are reorganized into an ordered sequence, thus resulting in the data of the compressed color conversion table being arranged according to a sequential ordering of grid point numbers. It is this normalized and sequentially ordered data that is compressed for storage in a memory device. Therefore, if the color conversion table isn't arranged according to a sequential order of grid point numbers, the correspondence between the input color data and the color component data is lost. Therefore, it cannot be said that Komatsu discloses a conversion table having a data structure similar to Applicant's compressed color conversion table wherein color conversion data are arranged according to a sequential ordering of grid point numbers

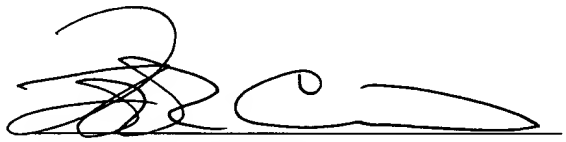
Furthermore, there would be no motivation to modify Ohta with the teachings of Komatsu since the values stored in the conversion table of Komatsu are constantly changing

during use as shown in Figs. 3, 9, 13, 17, 21, 25, 29 and 35 of Komatsu. Therefore, there is no motivation to employ Komatsu's conversion table in a compressed format. This is because Komatsu's conversion table would need to be read from memory, decompressed, written to, recompressed and then restored into memory each time the conversion table needed to be updated. As the purpose of the conversion table is to both map memory addresses of storage blocks and track free storage blocks, this action would need to be performed each time a storage block was allocated or freed. This would result in an adverse effect on performance of any memory system employing Komatsu's conversion table. Therefore, there would be no motivation by one skilled in the art of color conversion to look to Komatsu's memory management system for performance improving data structures.

In view of the foregoing remarks, and no other matters being raised in the Office Action, the entire application is believed to be in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

Applicant's undersigned attorney may be reached in our Costa Mesa, CA office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



Attorney for Applicant
Frank L. Cire
Registration No. 42,419

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-2200
Facsimile: (212) 218-2200

CA_MAIN 86178v2